



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/590,264

01/16/2008

Paul A. Kohl

062020-1860

6083

24504 7590 05/11/2010
THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP
600 GALLERIA PARKWAY, S.E.
STE 1500
ATLANTA, GA 30339-5994

EXAMINER

MOHADDES, LADAN

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

05/11/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

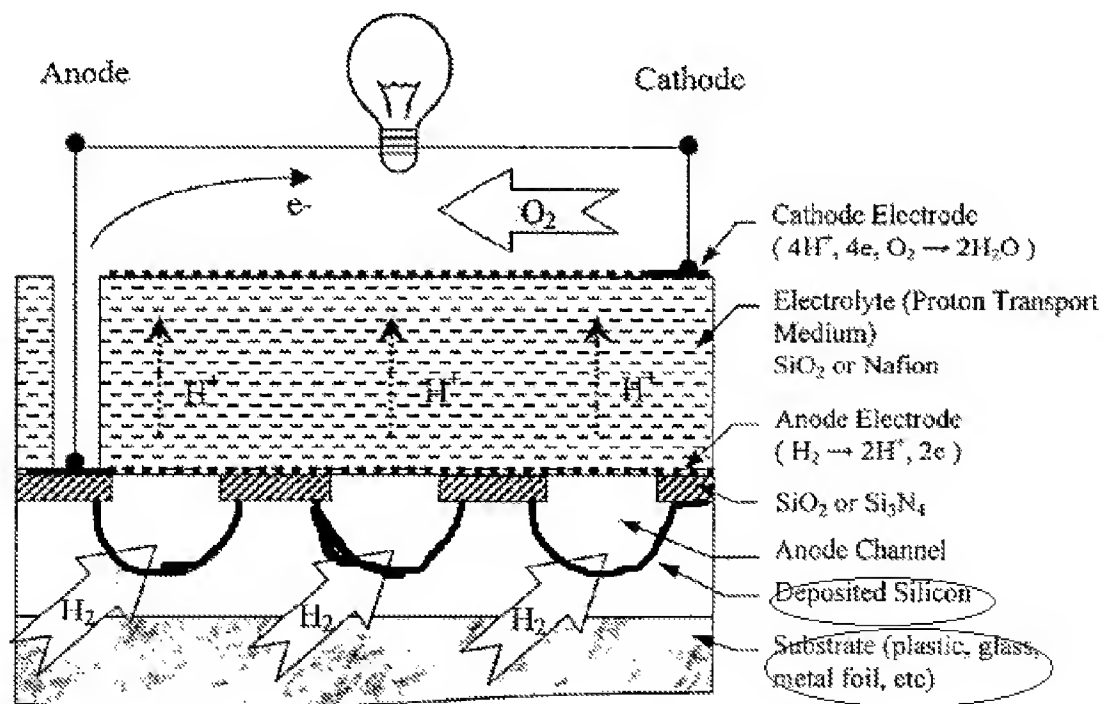
The time period for reply, if any, is set in the attached communication.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 04/26/2010 have been fully considered but they are not persuasive.

Response to arguments regarding claims 11, 13, 15, 18, and 19: The applicant has argued that the channels of prior art Fonash (US 20020020053) are positioned below the "top" surface of the substrate. The examiner respectfully disagrees and points out to the Figure 9(b) of Fonash wherein the anode channels are formed on top of the substrate and deposited silicon. The concept is further shown below by highlighting the top surface of the prior art:



In addition, the method of fabricating the anode channels is taught in paragraph [0147] of Fonash, which shows masking and patterning the silicon nitride layer on top of the silicon layer by selective etching which results in the void formation on top surface of the silicon layer.

Furthermore, the applicant argues that Sasahara prior art (US 6835488) does not render the modification obvious and that Fonash teaches away from such modification. The examiner again respectfully disagrees. To achieve a structure with hollow anode channels where in the channels pass through the membrane (rather than surface of membrane as thought by Fonash), the person with ordinary skills in the art would have been able to modify the structure of the Fonash by applying the membrane layer on top of the patterned sacrificial layer (photoresist) before removing the sacrificial layer as thought by Sasahara (col 8: ln 29-51) to achieve a membrane with corrugated structure to achieve high reaction surface area-to-volume ratio and therefore a high volumetric power density (col 3: ln 10-13).

Response to arguments regarding claims 20, 21, 24 and 25: The applicant has argued that the office action has not explicitly address each and every limitation of the claim. The examiner has pointed out to the method of fabrication of the structure of 9(b). The method is shown step by step on Fig. 10(b) and explained in paragraph [0147] in details. The applicant has particularly argued that Fonash does not teach depositing and removing sacrificial "polymer" layer provided on top surface of the substrate. The examiner respectfully disagrees and points out to paragraph [0147] of Fonash when photoresist layer (applicant's sacrificial layer) is provided on top of the substrate for

Art Unit: 1795

patterning. It is well known in the art that photoresist is a polymeric material such as:

Poly(methyl methacrylate) (PMMA), Poly(methyl glutarimide) (PMGI), Phenol formaldehyde resin (DNQ/Novolac), or SU-8 (See Sasahara col 8: ln 38). Additionally, deposition of catalyst layer is thought in paragraph [0150] and Figs. 9 (a-b).

Response to arguments regarding claims 26-28: The applicant has argued that the office action has not explicitly address each and every limitation of the claim. The same response as in the case of claims 20, 21, 24 and 25 applies here. Additionally, Fonash teaches alternating layer of anode and catalyst (Fig. 9 (a-b) and paragraph [0150]).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LADAN MOHADDES whose telephone number is (571)270-7742. The examiner can normally be reached on Monday to Thursday from 8:30 AM to 6:00 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1795

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/LADAN MOHADDES/
Examiner, Art Unit 1795

/PATRICK RYAN/
Supervisory Patent Examiner, Art Unit 1795